

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Currently Amended): A rotational phase difference detecting system for detecting a rotational phase difference between a plurality of rotating bodies, comprising:

a first rotating body with a first mark;

a second rotating body with a second mark;

a mark sensor ~~for detecting~~ configured to detect said first mark; and

a first camera ~~for imaging~~ configured to image said second mark when said mark sensor detects said first mark[[: and]],

a display section ~~for displaying~~ configured to display said second mark imaged by said first camera[[:]] ,

wherein a rotational phase difference between said first and second rotating bodies is detected from a position of an image of said second mark displayed on said display section.

Claim 2 (Currently Amended): The rotational phase difference detecting system as set forth in claim 1, further comprising:

an optical system ~~for restricting~~ configured to restrict an imaging range of said first camera[[:]],

wherein said first camera images said second mark through said optical system.

Claim 3 (Currently Amended): The rotational phase difference detecting system as set forth in claim 2, further comprising:

a light-emitting device ~~for emitting~~ configured to emit light to said second rotating body through said optical system[[:]],

wherein light from said light-emitting device is irradiated to said second rotating body when said mark sensor detects said first mark.

Claim 4 (Currently Amended): The rotational phase difference detecting system as set forth in claim 2, further comprising:

an actuator ~~for driving~~ configured to drive said first camera and said optical system, such ~~[[so]]~~ that an optical axis of said optical system is approximately normal to a side surface of said second rotating body.

Claim 5 (Currently Amended): The rotational phase difference detecting system as set forth in claim 1, further comprising:

an arm which has said first camera and said mark sensor mounted on one end thereof and a predetermined weight mounted on the other end~~[[;]]~~,
wherein said arm is mounted on a vibration removing table mounted on columns through an elastic body.

Claim 6 (Currently Amended): ~~[[The]]~~ A rotational phase difference detecting system ~~as set forth in claim 1, further comprising~~ for detecting a rotational phase difference between a plurality of rotating bodies, comprising:

a first rotating body with a first mark;
a second rotating body with a second mark;
a mark sensor configured to detect said first mark;
a first camera configured to image said second mark when said mark sensor detects
said first mark;

a second camera ~~for imaging~~ configured to image a third mark provided on said first rotating body when said mark sensor detects said first mark;

a display section configured to display said second mark imaged by said first camera and said third mark imaged by said second camera,

wherein a rotational phase difference between said first, second, and third rotating bodies is detected from a position of an image of said second and third marks displayed on said display section

~~wherein said display section displays an image of said third mark imaged by said second camera.~~

Claim 7 (Currently Amended): A rotational phase difference detecting method of detecting a rotational phase difference between a plurality of rotating bodies, comprising ~~the~~ steps of:

detecting a first mark provided on a first rotating body;

imaging and displaying a second mark provided on a second rotating body, when said first mark is detected; and

detecting a rotational phase difference between said first and second rotating bodies from a position of an image of said second mark.

Claim 8 (Currently Amended) ~~[[The]]~~ A rotational phase difference detecting method ~~as set forth in claim 7, further comprising the steps of:~~ of detecting a rotational phase difference between a plurality of rotating bodies, comprising:

detecting a first mark provided on a first rotating body;

imaging and displaying a second mark provided on a second rotating body and a third mark provided on said first rotating body, when said first mark is detected; [[and]]

detecting a position of an image of said second mark with an image of said third mark as reference; and

detecting a rotational phase difference between said first and second rotating bodies from a position of an image of said second mark.

Claim 9 (Currently Amended): A machine operating-state monitoring system, comprising the rotational phase difference detecting system as set forth in claim 1, ~~for monitoring the machine operating-state monitoring system configured to monitor an~~ operating state of a machine by employing said rotational phase difference detecting system.

Claim 10 (Currently Amended): The machine operating-state monitoring system as set forth in claim 9, wherein said rotational phase difference detecting system further comprises:

a rotational phase difference calculating section ~~for calculating~~ configured to calculate ~~[[a]]~~ the rotational phase difference between the first and second rotating bodies, and

a rotational phase difference deciding section ~~for deciding~~ configured to decide whether or not the rotational phase difference computed by said rotational phase difference calculating section is a predetermined value or greater; and

~~alarm means is provided for output an alarm~~ that outputs an alarm in response to a signal from said rotational phase difference deciding section.

Claim 11 (Currently Amended): The machine operating-state monitoring system as set forth in claim 9, wherein said rotational phase difference detecting system further comprises a rotational phase difference calculating section ~~for calculating~~ configured to

calculate ~~[[a]]~~ the rotational phase difference between the first and second rotating bodies;
and

said display section displays the calculated rotational phase difference in a time-series manner.

Claim 12 (Currently Amended): A machine operating-state monitoring system for monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, wherein:

said factory-side system comprises an alarm and a ~~[[the]]~~ rotational phase difference detecting system ~~as set forth in claim 1, and alarm means for outputting an alarm; for~~ detecting a rotational phase difference between a plurality of rotating bodies, the rotational phase difference detecting system including

a first rotating body with a first mark,

a second rotating body with a second mark,

a mark sensor configured to detect said first mark,

a first camera configured to image said second mark when said mark sensor detects said first mark, and

a display section configured to display said second mark imaged by said first camera, the rotational phase difference between said first and second rotating bodies being detected from a position of an image of said second mark displayed on said display section;

said remote-side system comprises a rotational phase difference deciding section ~~for~~ deciding configured to decide whether or not ~~[[a]]~~ the rotational phase difference detected by the rotational phase difference detecting system is a predetermined value or greater; and

when ~~it is decided by~~ said rotational phase difference deciding section decides that said rotational phase difference is said predetermined value or greater, said remote-side system transmits a signal to said factory-side system through said transfer medium, and said alarm ~~means~~ outputs an alarm in response to said signal.

Claim 13 (Currently Amended): A machine operating-state monitoring system for monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, wherein:

said factory-side system comprises,

a first rotating body with a first mark,

a second rotating body with a second mark,

a mark sensor ~~for detecting~~ configured to detect said first mark, [[and]]

a first camera ~~for imaging~~ configured to image said second mark when said mark sensor detects said first mark[[:]], and

~~said factory-side system further comprises alarm means for outputting an~~
alarm;

said remote-side system comprises,

a rotational phase difference calculating section ~~for calculating~~
configured to calculate a rotational phase difference between the first and second rotating bodies, based on information on said second mark imaged by said first camera, and

a rotational phase difference deciding section ~~for deciding~~ configured to decide whether or not the rotational phase difference calculated by said rotational phase difference calculating section is a predetermined value or greater; and

when ~~it is decided by~~ said rotational phase difference deciding section decides that said rotational phase difference is said predetermined value or greater, said remote-side system transmits a signal to said factory-side system through said transfer medium, and in response to said signal, said alarm ~~means~~ outputs an alarm.

Claim 14 (Currently Amended): A machine operating-state monitoring system for monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, wherein:

said factory-side system comprises,

a first rotating body with a first mark,

a second rotating body with a second mark,

a mark sensor ~~for detecting~~ configured to detect said first mark, and

a first camera ~~for imaging~~ configured to image said second mark when said mark sensor detects said first mark~~[[;]]~~ , and

~~said factory-side system further comprises~~ a display section;

said remote-side system comprises,

a rotational phase difference calculating section ~~for calculating~~ configured to calculate a rotational phase difference between the first and second rotating bodies,

based on information on said second mark imaged by said first camera; and

the rotational phase difference between the first and second rotating bodies, calculated by said rotational phase difference calculating section, is transmitted from said remote-side system to said factory-side system through said transfer medium and is displayed on said display section in a time-series manner.

Claim 15 (Currently Amended): The machine operating-state monitoring system as set forth in any one of claims 9 through 14, wherein:

a print with a possibility of printing trouble is extracted by monitoring an operating state of a printing machine; and

said plurality of rotating bodies are printing rolls.

Claim 16 (Currently Amended): A machine operating-state monitoring method of monitoring an operating state of a machine by a rotational phase difference between a plurality of rotating bodies, comprising:

~~an imaging step of~~ imaging a second mark provided on a second rotating body by a first camera when a mark sensor detects a first mark provided on a first rotating body; and

~~a rotational phase difference calculating step of~~ calculating ~~[[a]]~~ the rotational phase difference between said first and second rotating bodies, based on information on said second mark imaged by said imaging step.

Claim 17 (Currently Amended): The machine operating-state monitoring method as set forth in claim 16, further comprising:

~~a rotational phase difference deciding step of~~ deciding whether or not said rotational phase difference calculated by said rotational phase difference calculating step is a predetermined value or greater; and

~~an alarm output step of~~ outputting an alarm when ~~it is decided in~~ said rotational phase difference deciding step decides that said rotational phase difference is said predetermined value or greater.

Claim 18 (Currently Amended): The machine operating-state monitoring method as set forth in claim 16, further comprising:

~~a display step of displaying said rotational phase difference calculated by said rotational phase difference calculating step on a display section in a time-series manner.~~

Claim 19 (Currently Amended): A machine operating-state monitoring method of monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, said monitoring method comprising ~~the steps of:~~

detecting a rotational phase difference by ~~[[the]]~~ a rotational phase difference detecting system as set forth in claim 1, provided in said factory-side system, the rotational phase difference detecting system including[[:]]

a first rotating body with a first mark,

a second rotating body with a second mark,

a mark sensor configured to detect said first mark,

a first camera configured to image said second mark when said mark sensor detects said first mark, and

a display section configured to display said second mark imaged by said first camera, the rotational phase difference between said first and second rotating bodies being detected from a position of an image of said second mark displayed on said display section;

transmitting information on the detected rotational phase difference from said factory-side system to said remote-side system through said transfer medium;

deciding whether or not said rotational phase difference is a predetermined value or greater, based on the rotational phase difference information received by a rotational phase difference deciding section provided in said remote-side system;

transmitting a signal from said remote-side system to said factory-side system through said transfer medium when said phase difference deciding section decides that said rotational phase difference is said predetermined value or greater; and

outputting an alarm ~~by alarm means~~ provided in said factory-side system when said signal is received.

Claim 20 (Currently Amended): A machine operating-state monitoring method of monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, said monitoring method comprising ~~the steps of~~:

imaging a second mark provided on a second rotating body by a first camera provided in said factory-side system when a mark sensor provided in said factory-side system detects a first mark provided on a first rotating body;

transmitting information on the imaged second mark from said factory-side system to said remote-side system through said transfer medium;

calculating a rotational phase difference between said first and second rotating bodies, based on said second-mark information received by a rotational phase difference calculating section provided in said remote-side system;

deciding whether or not the calculated rotational phase difference is a predetermined value or greater, by a rotational phase difference deciding section provided in said remote-side system;

transmitting a signal from said remote-side system to said factory-side system through said transfer medium when said phase difference deciding section decides that said rotational phase difference is said predetermined value or greater; and

outputting an alarm ~~by alarm means~~ provided in said factory-side system when said signal is received.

Claim 21 (Currently Amended): A machine operating-state monitoring method of monitoring an operating state of a machine provided within a factory, by a factory-side system and a remote-side system connected through a transfer medium, said monitoring method comprising ~~the steps of~~:

imaging a second mark provided on a second rotating body by a first camera provided in said factory-side system when a mark sensor provided in said factory-side system detects a first mark provided on a first rotating body;

transmitting information on the imaged second mark from said factory-side system to said remote-side system through said transfer medium;

calculating a rotational phase difference between said first and second rotating bodies, based on said second-mark information received by a rotational phase difference calculating section provided in said remote-side system;

transmitting information on the calculated rotational phase difference from said remote-side system to said factory-side system through said transfer medium; and

displaying the transmitted information on a display section provided in said factory-side system in a time-series manner.

Claim 22 (Currently Amended): The machine operating-state monitoring method as set forth in any one of claims 16 through 21, wherein:

a print with a possibility of printing trouble is extracted by monitoring an operating state of a printing machine; and

said plurality of rotating bodies are printing rolls.

Claim 23 (New): A rotational phase difference detecting system for detecting a rotational phase difference between a plurality of rotating bodies, comprising:

a first rotating body with a first mark;

a second rotating body with a second mark;

a mark sensor configured to detect said first mark;

a first camera configured to image said second mark when said mark sensor detects said first mark; and

a display section configured to display a reference position corresponding to said first mark and to display said second mark imaged by said first camera,

wherein a rotational phase difference between said first and second rotating bodies is detected from a position of an image of said second mark displayed on said display section with respect to the reference position.

Claim 24 (New): A rotational phase difference detecting system for detecting a rotational phase difference between a plurality of rotating bodies, comprising:

a first rotating body with a first mark;

a second rotating body with a second mark;

a mark sensor configured to detect said first mark;

a first camera configured to image said second mark when said mark sensor detects said first mark; and

a display section configured to display said second mark every time said first mark is detected, the first mark being detected once per each complete revolution of the first rotating body,

wherein a rotational phase difference between said first and second rotating bodies is detected from a position of an image of said second mark displayed on said display section.

Claim 25 (New): The rotational phase difference detecting system as set forth in Claim 1, wherein the rotating bodies are printing rolls.

Claim 26 (New): The rotational phase difference detecting method as set forth in forth in Claim 7, wherein the rotating bodies are printing rolls.